Space Weather Forecast

Issued on Wednesday, 19 April 2023 at 12:41 Local

This forecast provides a four day assessment of space weather events. The probabilities stated below are for reaching or exceeding the given levels. For more information about space weather impacts please see the Met Office Space Weather Scales https://www.metoffice.gov.uk/weather/learn-about/space-weather/uk-scales

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Space Weather Forecast Headline: Minor Geomagnetic Storms likely due to CME (Coronal Mass Ejection) activity, with a chance of Moderate or Strong Storms on 20 and 21 April. Chance of Moderate-class X-ray flares (R1-R2 Minor-Moderate radio blackouts) throughout.

Analysis of Space Weather Activity over past 24 hours

Solar Activity: Solar activity has been Low, with occasional low-level Common-class flares observed. There are seven active regions on the visible disc. There are currently seven active regions on the visible disc. The largest and most complex region is located in the north, near centre disc. The remaining groups are small and simple, and appear to be either stable or in slow decay.

No Earth-directed CME have been observed in available imagery in the last 24 hours.

Solar Wind / Geomagnetic Activity: The solar wind was initially slightly elevated before a change to elevated levels in response to a CME arrival around 18/1400UTC, with a peak of 623 km/s observed at 18/2033UTC A slow decline was observed after midnight UTC, with speeds currently near 500km/s.Total magnetic field strength was at weak to moderate levels, before becoming strong for a few hours after 18/1400UTC. The important north-south component was also at weak to moderate levels with a period of negative orientation observed around 18/1600UTC as strong levels were reached. Geomagnetic activity was initially Quiet (Kp 1) becoming Active (Kp 4) by 18/1500UTC, with a period of G1/minor geomagnetic storms (Kp 5) from 18/1500-1800UTC. Activity then slowly subsided after midnight UTC.

Energetic Particles / Solar Radiation: No solar radiation storms were observed.

Four-Day Space Weather Forecast Summary

Solar Activity: Solar activity is expected to generally be Low, with a chance of isolated Moderate activity. There is also a chance for activity from a region beyond the northeastern limb, which is forecast to rotate onto the visible disc by day 2 (20 April).

Solar Wind / Geomagnetic Activity: Two CMEs may affect the Earth in this period. The first carries low confidence for a glancing blow on day 1 (19 Apr), with a further more direct CME hit, forecast on days 2 or 3 (20 or 21 Apr). Otherwise solar winds are expected to become slightly elevated with an initial period at elevated levels as a result of the CME that impacted the Earth on 18 April.

Geomagnetic activity is forecast to be Quiet to Unsettled, with a chance of Active to G1/Minor storm intervals (Kp 4-5) due to the potential glancing CME on 19 Apr. Activity is likely to reach G1/Minor Storm levels (Kp5) on 20 or 21 Apr due to the anticipated second CME arrival, with a chance of G2/Moderate or G3/Strong Storm conditions.

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Energetic Particles / Solar Radiation: Solar radiation storms are not expected and should remain at background levels.

Geomagnetic Storms:

Geo-Magnetic Storm Probability (Exceedance)	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Minor or Moderate	G1 to G2	Yes	50	60	60	30
Strong	G3	No	10	30	30	10
Severe	G4	No	1	5	5	1
Extreme	G5	No	1	1	1	1

Radio Blackouts - X Ray Flares:

X Ray Flares Probability	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	R1-R2 M Class	No	40	40	50	50
Very Active	R3 to R5 X	No	1	1	5	5

Solar Radiation Storms - (High Energy Protons):

Radiation Storms Probability (Exceedance)	Level (cm^{-2} sr^{-1} s^{-1})	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	≥ S1	No	5	1	1	1
Very Active	≥ S3 *	No	1	1	1	1
* S3 ≥ 10 MeV ≥ 1000 pfu and / or ≥ 50 MeV ≥ 10 pfu. (pfu = $cm^{-2}sr^{-1}s^{-1}$)						

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